

Serial No. 09/910,497
Supplemental Response dated March 17, 2006
Reply to Office Action of October 3, 2005

Docket No.: 290397.0007
(97541.00007)

Remarks

Claims 5 and 14-26 were previously cancelled. Claims 30-39 were previously withdrawn. In this supplemental response, claims 4, 28-29 and 43 are cancelled. Accordingly, claims 1-3, 6-13, 27, 40-42 and 44-50 are currently pending.

Applicants thank the Examiner for the courtesy extended in the interview held on February 14, 2006.

In the October 3, 2005 Office Action, claims 1-4, 6-13, 27-29 and 40-50 were rejected under 35 U.S.C. § 112 as failing to comply with the written description requirement. Claims 1-4, 6-13, 27-29 and 40-50 were also rejected under 35 U.S.C. § 102(b) as being anticipated by Evans, WO 96/37570. Claims 1, 3, 4, 27-29, 40, 42 and 43 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting in view of copending application publication no. US 2002/0171063 A1. Claims 1-4, 6-13, 27-29, and 40-50 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting in view of copending application publication no. US 2002/0020828 A1.

Claim 1 has been amended to recite in the preamble that the heat transfer fluid of the present invention can be used as an engine coolant in environmental conditions ranging from ambient temperatures of -35° F to +130° F. This amendment is supported in the specification at Paragraph 0029 of the published application, which specifically states that the non-aqueous heat transfer fluids of the invention can be used in this temperature range.

Claims 1, 27 and 40 have been amended to specifically recite that propylene glycol is the diol used in combination with ethylene glycol in the non-aqueous heat transfer fluid of the

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present invention. This amendment is supported throughout the specification, including, for example, in paragraph 0049 which states that propylene glycol and ethylene glycol are used in one embodiment of the invention. Dependent claims 3 and 42 have been amended to clarify these claims in view of the amendments to the independent claims described above.

Claims 1 and 27 were previously amended to recite that ethylene glycol comprises between greater than 60 percent to about 70 percent ethylene glycol relative to the total weight of diols in the heat transfer fluid. This amendment is supported at paragraph 0028 and paragraph 0049, which states that "[t]he non-aqueous heat transfer fluid may contain [ethylene glycol] in any amount ranging between 0 percent by weight to about 70 percent by weight of the total weight of [ethylene glycol] and [propylene glycol] in the fluid." The amendment is further supported at paragraph 0068, which describes testing using a formulation in which "the fraction of [propylene glycol] in the mixture as compared to the total of the diols was 30 percent and the fraction of [ethylene glycol] was 70 percent." As discussed in detail below, this amendment meets the requirements of 35 U.S.C. §112, paragraph one.

As recited in claims 1-3, 6-13, 27, 40-42 and 44-50 as amended, the present application is directed to a non-aqueous heat transfer fluid having reduced toxicity and methods for reducing the toxicity of ethylene glycol based heat transfer fluids. As set forth in claim 1 as amended, the heat transfer fluid comprises between greater than 60 percent by weight and about 70 percent by weight (of the total weight of diols in the fluid) ethylene glycol, at least one additional diol which acts as an inhibitor for ethylene glycol poisoning,

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and at least one corrosion inhibitor additive that is soluble in ethylene glycol and the additional diol.

As recited in claims 27, 40-42 and 44-50 as amended, the present application is also directed to methods for reducing the toxicity of existing ethylene glycol based fluids by adding propylene glycol, which reduces the toxicity of the ethylene glycol based fluid. As recited in claim 27 as amended, after addition of the propylene glycol, the resulting heat transfer fluid contains a concentration of ethylene glycol by weight that is between greater than 60 percent and about 70 percent of the total weight of the propylene glycol and the ethylene glycol in the fluid.

The heat transfer fluid recited in the amended claims is non-aqueous, meaning that water is not added or intended to be added to the fluid. Any water that is present is an impurity and would be present in very small amounts. Any such water would typically be removed from the fluid in use when the fluid is heated, as in an engine, because the water would be converted to vapor and vented from the system. Because water may only be present in very small amounts as an impurity, any water present in the fluid is insufficient to cause corrosion, and there is no need to include additives to prevent water-caused corrosion of internal surfaces, i.e. no inhibitors requiring water to remain in solution are necessary.

As set forth in the specification at, for example, paragraph 0027, the only additives present in the heat transfer fluid of the present invention are completely soluble in the ethylene glycol and propylene glycol without the presence or addition of any water. These additives remain dissolved in the fluid regardless of storage or use. As described in the specification at paragraphs 0016 to 0021, prior art glycol based heat transfer concentrates

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required from 3% to 5% by weight water to dissolve additives that need water for solubility, such as metasilicate corrosion inhibitors and buffers. Even with 3% to 5% water, the water-requiring additives would often precipitate out of solution during storage of the concentrate, and if enough additional water were not added to the concentrate to form the heat transfer fluid, the water-requiring additives would precipitate or gel during use at elevated temperatures.

Rejections Under 35 U.S.C. § 112

In the October 3, 2005 Office Action ("the Office Action"), the Examiner rejected claims 1-3, 6-13, 27-29 and 40-50 for failing to comply with the written description requirement. The Examiner first states that the amendment to the preamble stating that the fluid has "a freezing point at atmospheric pressure of less than minus 10°C and a boiling point at atmospheric pressure of greater than 150°C" is not supported in the specification. The preamble to claim 1 has been amended to recite that the heat transfer fluid can be used as an engine coolant in environmental conditions ranging from ambient temperatures of -35° F to +130° F. This amendment is supported in the specification at Paragraph 0029 of the published application, which specifically states that the non-aqueous heat transfer fluids of the invention can be used in this temperature range.

The Examiner also rejected claims 1, 27 and 43 under 35 U.S.C. §112 on the grounds that the specification does not support claims to a fluid having greater than about 70 percent by weight ethylene glycol. The applicants do not concede or admit that the application as filed could not support claims to a heat transfer fluid containing more than about 70 percent by weight ethylene glycol, but the claims have been amended to recite a heat transfer fluid

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having an upper limit for ethylene glycol of about 70 percent by weight. As discussed in detail below, the claims as amended are fully supported by the specification.

The previous amendments to claims 1 and 27 recite that the heat transfer fluid contains between greater 60 percent by weight to about 70 percent by weight ethylene glycol also meets the requirements of 35 U.S.C. § 112, paragraph one. The claimed invention relates to reduced toxicity, non-aqueous heat transfer fluids containing ethylene glycol and a second diol, in particular propylene glycol. The specification states that the non-aqueous heat transfer fluid can contain ethylene glycol "in any amount between 0 percent by weight up to about 70 percent by weight of the total weight of the [ethylene glycol] and [propylene glycol] in the fluid." Paragraph 0049 (emphasis added). The specification also states that "[propylene glycol] acts as an antidote for [ethylene glycol] poisoning, thereby rendering mixtures of [propylene glycol] and [ethylene glycol] non-toxic even up to ethylene glycol proportions of 70 percent by weight." Paragraph 0028 (emphasis added). Accordingly, the specification clearly conveys to those skilled in the art that the invention contemplates heat transfer fluids containing any amount of ethylene glycol up to about 70 percent by weight of the total weight of the diols in the fluid. In a preferred embodiment described in the specification, the heat transfer fluid is comprised of about 70 percent by weight ethylene glycol and about 30 percent by weight ethylene glycol. Paragraphs 0049 and 0068.

"The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, the specific subject matter later claimed by him; how the specification accomplishes this is not material." In re Wertheim, 541 F.2d 257, 262 (C.C.P.A. 1976). "The written description requirement does not require

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identical descriptions of claimed compounds, but it requires enough disclosure in the patent to show one of skill in the art that the inventor 'invented what is claimed'." Union Oil Co. of California v. Atlantic Richfield Co., 208 F.3d 989, 1001 (Fed. Cir. 2000). The disclosure in the specification cited above, as well as other discussions of the claimed heat transfer fluid in the specification, is clearly sufficient to show one of skill in the art that the applicants had contemplated heat transfer fluids containing any amount of ethylene glycol up to about 70 percent by weight.

In In re Wertheim, the Court of Customs and Patent Appeals reversed the rejection of claims that had been amended from a broader range of 25% to 60% by weight to "between 35% and 60% by weight." The claims were rejected during examination for not containing literal support in the specification. The court held that this was not enough to support the rejections. The court stated:

If lack of literal support alone were enough to support a rejection under § 112, then the statement of *In re Lukach*, 442 F.2d at 969 . . . that "the invention claimed does not have to be described *in ipsius verbis* in order to satisfy the description requirement of § 112," is empty verbiage.

541 F.2d at 265. The court noted that applicants frequently amend their applications to claim less than what is described in an application, but all that is required is that specification reasonably describe what is claimed. Id. at 263. "The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not *in ipsius verbis* is insufficient." Id. at 265.

The present application specifically describes the non-aqueous heat transfer fluid as containing any amount of ethylene glycol between 0 percent by weight and 70 percent by

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weight, and states that the reduced toxicity of the fluid containing ethylene glycol and propylene glycol is observed at ethylene glycol concentrations of "up to" 70 percent by weight. These disclosures alone are sufficient to meet the written description requirement.

Rejection Under 35 U.S.C. §102

The Examiner has also rejected amended claims 1-4, 6-12, 27-29 and 40-50 under 35 U.S.C. §102(b) as being anticipated by Evans, WO 96/37570. This grounds for rejection was fully addressed previously in the January 3, 2006 Office Action response, which is being resubmitted herewith due to a defect in the original submission. Although the present amendments do not change the discussion of Evans previously submitted, that discussion is presented below for ease of reference.

Evans describes a non-aqueous heat transfer fluid preferably comprised of propylene glycol as the only glycol present in the fluid. WO 96/37570 at page 16, lines 5-7. Although Evans states that the fluid may contain ethylene glycol in addition to propylene glycol, Evans also states that the fluid must contain at least 40% by weight propylene glycol to the heat transfer fluid's characteristics and to avoid increased toxicity. WO 96/37570 at page 16, lines 7-14. All of the heat transfer fluids described and claimed in WO 96/37570 contain at least 40% by weight propylene glycol. The heat transfer fluids described in WO 96/37570 that contain ethylene glycol all contain less than 60% by weight ethylene glycol.

In the present application, the inventors unexpectedly discovered that an ethylene glycol based, non-aqueous heat transfer fluid could be substantially reduced in toxicity by addition of propylene glycol at concentrations of less than 40% propylene glycol, and that such a heat transfer fluid would function satisfactorily. The claims as amended recite that the

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mixture of ethylene glycol and propylene glycol in the heat transfer fluid must contain more than 60% by weight ethylene glycol, meaning the propylene glycol must comprise less than 40% by weight of the total weight of the ethylene glycol and the propylene glycol in the non-aqueous heat transfer fluid. Because the claims as amended require more than 60% by weight ethylene glycol, the heat transfer fluid recited in the claims as amended is not the same as the heat transfer fluid described in WO 96/37570.

In order to anticipate a claim under 35 U.S.C. §102, all of the limitations of the claim must be disclosed in a single prior art reference. MPEP § 2131; *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). Claims 1-4, 6-13, 27-29 and 40-50 as amended recite that the heat transfer fluid must contain greater than 60% by weight ethylene glycol relative to the total weight of diols in the fluid. Accordingly, the heat transfer fluid recited in the claims as amended necessarily contains less than 40% of a second diol such as propylene glycol. As set forth in detail above, WO 96/37570 does not describe a non-aqueous fluid containing greater than 60% ethylene glycol. Therefore, WO 96/37570 does not describe a fluid meeting each and every limitation of the fluid recited in the claims as amended. Accordingly, WO 96/37570 does not anticipate the amended claims under 35 U.S.C. §102(b).

Double Patenting Rejections

As with the Evans reference, the Examiner's double patenting rejection was fully addressed previously in the January 3, 2006 Office Action response, which is being resubmitted herewith due to a defect in the original submission. Although the present

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amendments do not change the discussion of the double patenting rejection previously submitted, that discussion is presented below for ease of reference.

The Examiner has provisionally rejected claims 1, 3, 4, 27-29, 40, 42 and 43 under the judicially created doctrine of obviousness-type double patenting over the claims of copending Application No. US2002/0171063 and Application No. 2002/0020828. These applications both describe aqueous fluids comprising ethylene glycol and propylene glycol. Aqueous heat transfer fluids are different from non-aqueous heat transfer fluids such as the heat transfer fluids recited in claims 1-4, 6-13, 27-29 and 40-50 of the present application. It would not be obvious to one skilled in the art to modify the aqueous heat transfer fluids of the cited applications by removing water to create the non-aqueous heat transfer fluids recited in the amended claims of the present application.

While the applicants maintain that claims 1, 3, 4, 27-29, 40, 42 and 43 are not obvious over the claims of copending Application No. US2002/0171063 and Application No. 2002/0020828, applicants will file a terminal disclaimer to expedite prosecution of this application if this is the sole remaining grounds for rejection.

The Examiner has also stated that claims 1-4, 6-13, 27-29 and 40-50 are provisionally rejected as being unpatentable over the claims of copending Application No. 2002/0020828. Applicants believe that there is a typographical error, and that the Examiner may have intended to cite copending Application No. 2003/0071242. To the extent that the Examiner intended to cite Application No. 2002/0020828, as discussed above, the applicant maintains that the cited Application No. 2002/0020828 directed to aqueous heat transfer fluids does not render the non-aqueous heat transfer fluids of the present invention obvious, but the applicant

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will file a terminal disclaimer to expedite prosecution of this application if this is the sole remaining grounds for rejection.

To the extent that the Examiner intended to cite Application No. 2003/0071242, while applicants maintain that amended claims 1-4, 6-13, 27-29 and 40-50 of the present application are not obvious in view of the claims of Application No. 2003/0071242, to expedite prosecution of the instant application, applicants will agree to file a terminal disclaimer if this is the sole remaining grounds for rejection.

Applicant has submitted herewith a Supplemental Information Disclosure Statement identifying reference which were identified in a recent Office Action relating to copending application Serial No. 10/629,642. Applicants do not believe that these references affect patentability of the amended claims.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes after considering these remarks, that the application is not in condition for allowance, and in particular if a terminal disclaimer is required for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

Because the reasons above are sufficient to traverse the rejection, Applicants have not explored, nor do they now present, other possible reasons for traversing such rejections. Nonetheless, Applicants expressly reserve the right to do so, if appropriate, in response to any future Office Action.

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No fee is believed to be required. However, if a fee is required or otherwise necessary to cover any deficiency in fees previously paid, authorization is hereby given to charge our Deposit Account No. 50-3569.

Respectfully submitted,

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